



The background of the slide features a close-up, high-magnification photograph of water droplets and bubbles. The droplets are of various sizes, some in sharp focus showing internal reflections, while others are blurred in the foreground or background. The overall color palette is light blue and white, giving it a clean, scientific feel.

Industrial Treatment in Lagoon Structures

IGSP Assistance Workshop

November 9, 2011

Presented by Patrick Ely

Regional Manager Environmental Dynamics International

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Overview

- **Introduction**
- **EDI Experience in Industrial Treatment**
- **Industrial Lagoon Treatment**
 - **Lagoon Types**
 - **Estimating Treatment Capacity**
 - **Aeration Considerations**
 - **Blower Considerations**
 - **Design Example**
- **Open Forum/Discussion**



**Founded in 1975, the focus of EDI
has been advanced technology
diffused aeration systems.**

With its vast experience in supporting the aeration demands of many biological processes, EDI also offers advanced treatment biological systems for lagoons.



In total, EDI serves wastewater treatment facility owners in over 90 countries, has over 6,000 installations, and treats wastewater from an equivalent of over 300 million people.



Industrial Lagoon Treatment

- **Represents a Mature Design Option**
- **EDI Experience Goes Back +25 Years**
 - Petrochem
 - Pulp/Paper
 - Chemical
 - Pharmaceutical
 - Animal (Raising, Processing)
 - Food
- **Consultants Highly Specialized**
- **Each has Unique Characteristics and Successful Past History Critical**

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Industrial Lagoon Treatment

- **EDI Experience in Iowa**
 - Golden Oval Eggs
 - Northern Natural Gas
 - Rose Acre Farms
 - Fremont Farms
 - Premium Iowa Pork
 - Hawkeye Pride

The background of the slide is a close-up, artistic photograph of numerous water bubbles of various sizes. The bubbles are in sharp focus in the foreground, showing their spherical shape and the way light reflects off their surfaces. Some bubbles are partially cut off by the edges of the frame. The overall color palette is light and airy, with whites, greys, and soft blues.

Industrial Lagoon Treatment

- **Lagoon Types**
 - **Facultative**
 - **Anaerobic**
 - **Aerated**
 - **Complete Mix**
 - **Partial Mix**



Industrial Lagoon Treatment

- **Estimating Treatment Capacity**
 - **Aerated**
 - USEPA Design Manual for WW Stabilization Ponds (EPA-625/1-83-015)
 - Reaction Rate Critical
 - Estimate BOD Reduction Potential as Function of HRT, Temperature, K rate, Aeration Intensity (CM or PM)

The background of the slide features a close-up, artistic photograph of water. On the left side, a curved glass surface is visible, with several large, clear water droplets clinging to it. The rest of the background is filled with numerous smaller, out-of-focus bubbles of varying sizes, creating a sense of movement and depth. The overall color palette is light blue and white, giving it a clean, aquatic feel.

Industrial Lagoon Treatment

- **Estimating Treatment Capacity**
 - **Aerated**
 - If RAS involved may use conventional Activated Sludge Models to Estimate Treatment Capacity Rather than USEPA Methodology

The background of the slide features a close-up, artistic photograph of numerous water bubbles of varying sizes. The bubbles are in sharp focus in the foreground, showing their spherical shape and the way light reflects off their surfaces. Some bubbles are partially overlapping, creating a sense of depth. The overall color palette is cool, with various shades of blue and white, giving it a clean, scientific, or environmental feel.

Industrial Lagoon Treatment

- **Aeration Considerations**
 - Mechanical Surface
 - Aspirating Floaters
 - Diffused Aeration
 - Combination
- **Ownership Considerations**
 - Initial Capital vs. Long Term Operating Costs
 - Heightened Focus on Energy Efficiency

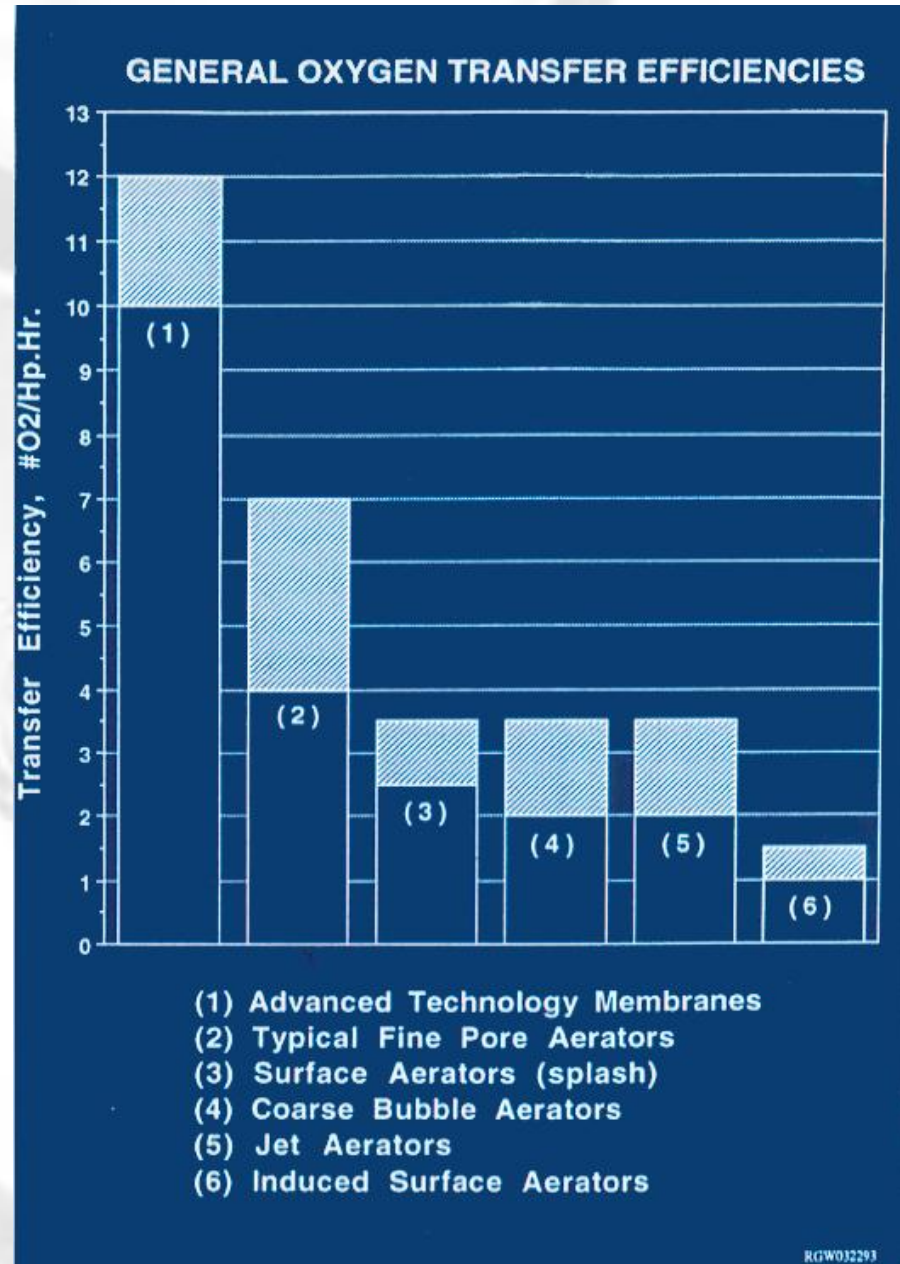
The background of the slide features a close-up, high-contrast photograph of water bubbles. A prominent, curved, light-colored line sweeps across the left side of the frame. The bubbles are of various sizes, some in sharp focus showing their spherical structure and light reflections, while others are blurred in the background, creating a sense of depth and movement.

Industrial Lagoon Treatment

- **Oxygen Transfer Efficiency**
- **Single Most Critical Design Decision for Aeration**
- **Accounts for 65%-90% of Total Operating Cost of the WWTP**
- **Diverse Products and Performance**

Product Capabilities

SAE
(lb
O₂/hp-hr)

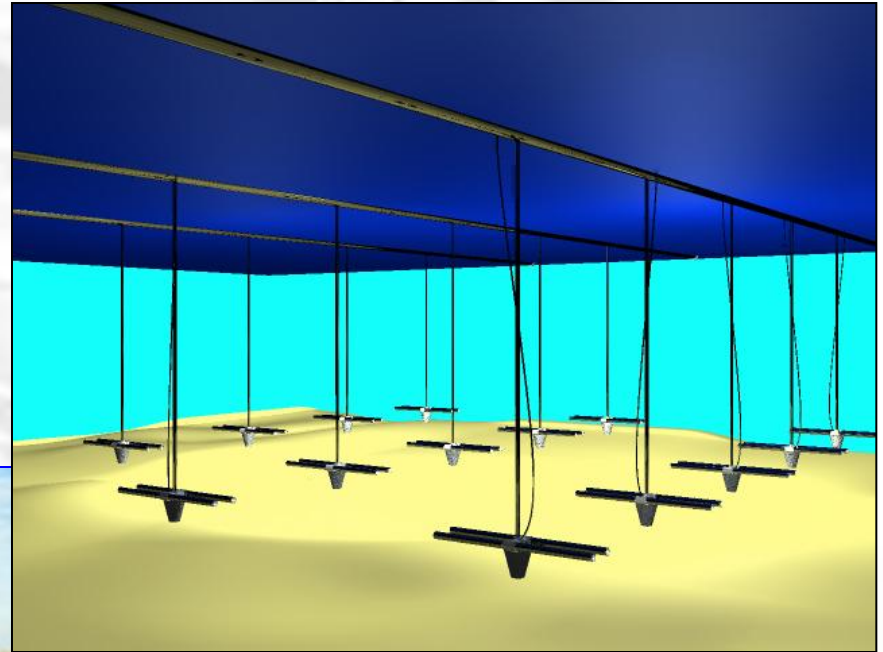


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Industrial Lagoon Treatment

- **Aeration Considerations**
 - Assumed Process Variables Critical (alpha, beta, #/#)
 - Prior Experience Invaluable
 - AOR vs SOR

Floating Lateral System



EDI Floating Lateral Systems

- Field Proven System
 - Offered since 1987
 - Over 200 installations
 - Municipal and Industrial Applications
 - +45 Pulp and Paper Applications since 1991
 - Small and Large Systems
 - Largest System has laterals extending over 1200 feet.

The background of the slide features a close-up, artistic photograph of water droplets and bubbles. The droplets are in various stages of formation and movement, creating a sense of dynamic fluidity. The lighting is soft, highlighting the spherical shapes and the refractive properties of the water. The overall color palette is cool, dominated by blues, greys, and whites.

Floating Lateral Features

- Installed without Taking System Off-line
- Butt Fusion Welded Construction
- Side Wall Fusion Outlets
- Maintained with System On Line



08/17/2005

















Pulp and Paper Plant Expansion

New Diffused Aeration Grid



Existing 75 Hp Surface Aerator



Food Processing

Reedsburg Foods

Reedsburg, WI



Textile

Cone Mills

Carlisle, NC



Chemical

International Bio-synthetics

Kingstree, SC



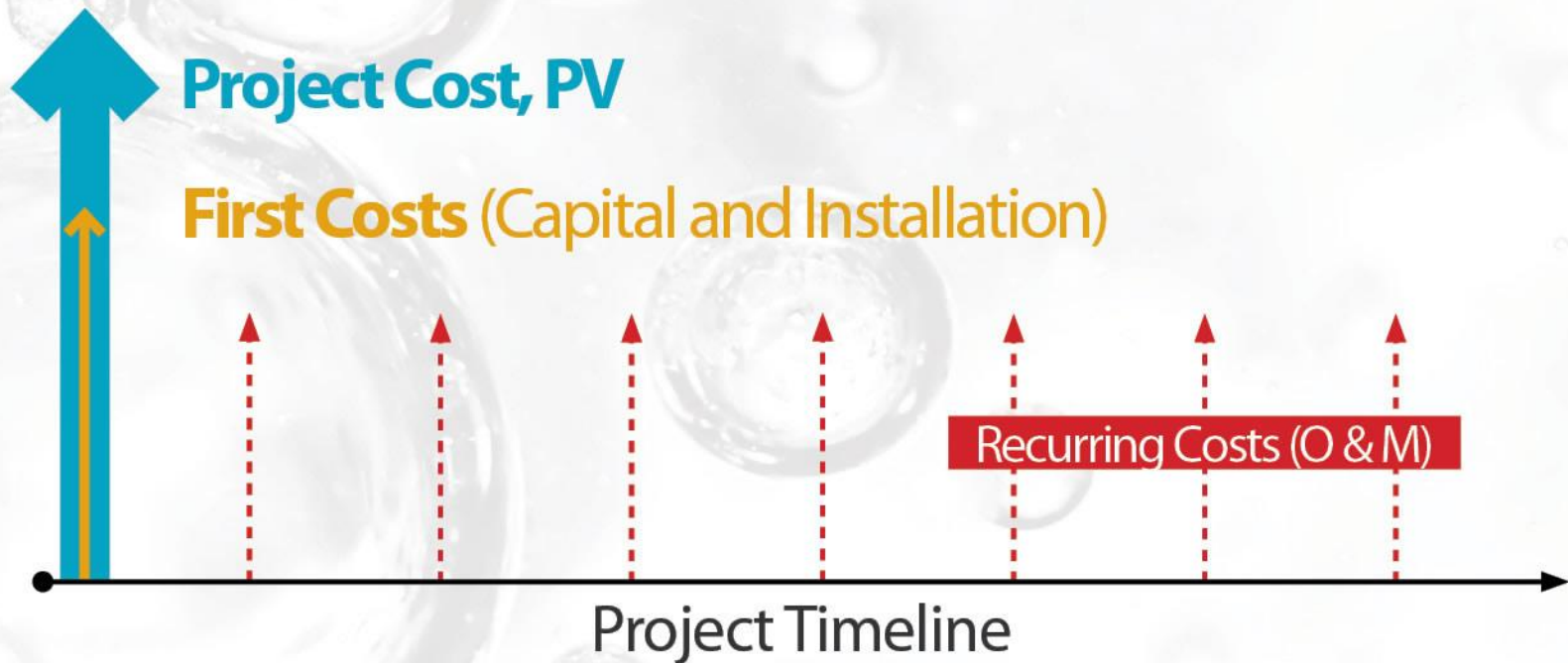
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How to Select an Aeration System?

Single most important decision of the entire project!

Life Cycle Cost Evaluation



Design Example

- 2.5 MGD Facility with 1000 mg/l BOD
- Fine Bubble Floating Lateral System (672 BHp)
- Corresponding Surface Aerator System (1120 BHp)
- Capital Cost of FB System \$400K (complete)
- 5.5 cents per Kw, 6% interest, 2.75 year ROI

Design Example

- Egg Laying Operation in Iowa
 - 0.03 MGD, 8000 mg/l BOD, 1520 mg/l TSS, 465 mg/l ammonia
 - Three Cell Aerated Process (CM-PM-PM)
 - 25/25/5 (BOD/TSS/TKN)
 - 4,400 scfm @ 7 psig
 - Effluent Irrigated on Adjacent Crop Land

Industrial Lagoon Treatment

- Blowers
 - Positive Displacement (PD's)
 - Centrifugal
 - High Speed Turbo
- VFD's for Energy Efficiency to Pace Aeration System with Organic Loading

Contract Services™

Aeration system maintenance & installation services

EDI Contract Services personnel have the experience and knowledge to handle unique systems and offers a cost effective alternative for installation and maintenance for your aeration system.

- Install new aeration systems
- Maintain or refurbish existing aeration systems
- Develop and implement long-term maintenance programs
- Service all brands of aeration systems



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Industrial Lagoon Treatment Summary

- Proven Treatment Strategy
- Experience in that Industry Critical
- Low Capital vs. Ownership Cost

